

WHAT IS CLAIMED IS:

1 1. A total knee prosthesis capable of providing  
2 resurfacing to the adjacent ends of the existing bone  
3 structures, as well as total posterior stabilization to  
4 the knee joint, comprising:  
5 a) a femoral component including:  
6 i) a medial condyle having an anterior portion,  
7 a distal portion and a posterior portion;  
8 ii) a lateral condyle having an anterior  
9 portion, a distal portion and a posterior portion;  
10 iii) an anterior patella flange interconnecting  
11 the anterior portions of the medial and lateral condyles  
12 in parallel, spaced apart relation; and  
13 iv) cam member means integral with said medial  
14 and lateral condyles and located outboard thereof, said  
15 cam member means having an anteriorly located concave cam  
16 member surface and a posteriorly located convex cam  
17 member surface; *aa*  
18 b) a tibial component including:  
19 i) multi-radius tibial plateau bearing surface  
20 means for receiving said medial and lateral condyles for  
21 rolling and sliding movement thereon; and  
22 ii) follower member means integral with said  
23 bearing surfaces for receiving the cam surfaces of said  
24 cam member means for rotational and sliding movement  
25 thereon; and  
26 c) the cam member surfaces of said cam member means  
27 being in contact with said follower member means for  
28 substantially the entire flexion range of the knee.

1 2. A total knee prosthesis according to Claim 1,  
2 wherein said medial and lateral condyles have inner  
3 fixation surfaces for fixing said femoral component to  
4 the distal end of a femur, and said cam member means and  
5 said follower member means having heights which are no  
6 greater than the boundaries of said inner fixation

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7 surfaces.

1 3. A total knee prosthesis according to Claim 1,  
2 wherein said convex cam member surface has a center of  
3 curvature substantially the same as the center of  
4 curvature of said respective follower member means and of  
5 said respective tibial plateau bearing surface means.

1 4. A total knee prosthesis according to Claim 1,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the  
4 same as the radius of curvature of said respective convex  
5 cam member surfaces, said respective follower members,  
6 and said respective tibial plateau bearing surface means.

1 5. A total knee prosthesis according to Claim 1,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said convex cam member surfaces, said  
6 respective follower member means, and said respective  
7 tibial plateau bearing surface means.

1 6. A total knee prosthesis according to Claim 1,  
2 wherein said medial and lateral cam member means is  
3 integral with the outboard portion of the medial and  
4 lateral distal femoral condyles and said cam member means  
5 includes respective anterior concave surfaces connected  
6 with the respective posterior convex cam member means,  
7 and the medial and lateral posterior convex cam member  
8 means are connected to the outboard portion of the  
9 respective medial and lateral posterior femoral condyles.

1 7. A total knee prosthesis according to Claim 6,  
2 wherein said medial and lateral outboard cam member means  
3 are spaced apart by substantially one full distal or  
4 posterior femoral condyle width plus the intercondylar

5 gap therebetween.

1 8. A total knee prosthesis according to Claim 1,  
2 wherein said medial and lateral cam member means extends  
3 anteriorly substantially to the posterior border of the  
4 anterior-distal femoral condyles, and posteriorly  
5 substantially to the anterior border of the distal-  
6 posterior femoral condyles.

1 9. A total knee prosthesis according to Claim 1,  
2 wherein said tibial plateau bearing surface means  
3 includes:

4 a. a medial multi-radius tibial plateau bearing  
5 surface means located inboard of said follower means and  
6 having an anterior, central and posterior portion for  
7 receiving said medial femoral condyle for rolling and  
8 sliding movement thereon;

9 b. a lateral inboard multi-radius tibial plateau  
10 bearing surface means located inboard of said follower  
11 means and having an anterior, central and posterior  
12 portion for receiving said inboard portion of the lateral  
13 femoral condyle for rolling and sliding movement thereon;

14 c. a medial outboard-located follower member  
15 consisting of a convex follower member surface anteriorly  
16 and a concave arcuate follower member surface posteriorly  
17 for receiving said anterior concave cam member surface  
18 and posterior convex cam member surface of the medial cam  
19 member means for rolling and sliding movement thereon,  
20 said medial concave arcuate follower member surface being  
21 connected to the respective posterior portion of the  
22 concave arcuate tibial plateau bearing surface means;

23 d. a lateral outboard-located follower member  
24 consisting of a convex follower member surface anteriorly  
25 and a concave arcuate follower member surface posteriorly  
26 for receiving said anterior concave cam member surface  
27 and posterior convex cam member surface of the medial cam  
28 member means for rolling and sliding movement thereon,

29 said lateral concave arcuate follower member surface  
30 being connected to the respective posterior portion of  
31 the concave arcuate tibial plateau bearing surface means;  
32 and

33 e. an interconnecting intercondylar eminence  
34 centrally disposed between the medial and lateral multi-  
35 radius tibial plateau bearing surface means, said  
36 interconnecting eminence being connected to said plateau  
37 bearing surface means, and said being removed within the  
38 posterior intercondylar portion to provide required  
39 clearance for retained anterior and posterior cruciate  
40 ligament structures.

1 10. A total knee prosthesis according to Claim 9,  
2 wherein said convex cam member integrated within the  
3 outboard portion of the medial and lateral distal femoral  
4 condyles has a center of curvature being substantially  
5 the same as the center of curvature of said respective  
6 outboard concave arcuate follower members, of said  
7 respective outboard posterior portion of the concave  
8 arcuate tibial plateau bearing surface means and of said  
9 respective inboard posterior portion of the concave  
10 arcuate femoro-tibial plateau bearing surface members  
11 means.

1 11. A total knee prosthesis according to Claim 9,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the  
4 same as the radius of curvature of said respective  
5 outboard convex cam members, of said respective outboard  
6 concave arcuate follower members, of said respective  
7 outboard posterior portion of the concave arcuate tibial  
8 plateau bearing surface means, and of said respective  
9 inboard posterior portions of the concave arcuate femoro-  
10 tibial plateau bearing surface member means.

1 12. A total knee prosthesis according to Claim 9,

2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said medial and lateral outboard convex  
6 cam member means, of said respective outboard concave  
7 arcuate follower member means, of said respective  
8 outboard posterior portion of the concave arcuate tibial  
9 plateau bearing surface means and of said respective  
10 inboard posterior portions of the concave arcuate femoro-  
11 tibial plateau bearing surface member means.

1 13. A total knee prosthesis according to Claim 9,  
2 wherein said tibial component includes a tibial plateau  
3 bearing component containing medial and lateral multi-  
4 radius femoro-tibial plateau bearing surface means, an  
5 interconnecting centrally disposed eminence and outboard-  
6 located medial and lateral follower member means, and a  
7 tibial base component connected to an underside of said  
8 tibial plateau bearing component by means of a continuous  
9 and wedging peripheral and central engaging dovetail  
10 structures and preloaded and secured with a screw thread  
11 locking means which is installed anteriorly.

1 14. A total knee prosthesis capable of providing  
2 resurfacing to the adjacent ends of the existing bone  
3 structures, as well as total posterior stabilization to  
4 the knee joint, comprising:  
5 a) a femoral component including:  
6 i) a medial condyle having an anterior portion,  
7 a distal portion and a posterior portion;  
8 ii) a lateral condyle having an anterior  
9 portion, a distal portion and a posterior portion;  
10 iii) an anterior patella flange interconnecting  
11 the anterior portions of the medial and lateral condyles  
12 in parallel, spaced apart relation; and  
13 iv) cam member means integral with said medial  
14 and lateral condyles and located outboard thereof, said

15 cam member means having an anteriorly located concave cam  
16 member surface and a posteriorly located convex cam  
17 member surface;

18 b) a tibial component including:

19 i) multi-radius tibial plateau bearing surface  
20 means for receiving said medial and lateral condyles for  
21 rolling and sliding movement thereon; and

22 ii) follower member means integral with said  
23 bearing surfaces for receiving the cam surfaces of said  
24 cam member means for rotational and sliding movement  
25 thereon; and

26 c) said convex cam member surface being in sliding  
27 contact with said follower member means to provide  
28 posterior rollback of said condyles on said tibial  
29 plateau bearing surface means during flexion, starting at  
30 approximately maximum normal hyperextension of flexion,  
31 and being completed at an angle less than approximately  
32 40° of flexion.

1 15. A total knee prosthesis according to Claim 14,  
2 wherein said medial and lateral condyles have inner  
3 fixation surfaces for fixing said femoral component to  
4 the distal end of a femur, and said cam member means and  
5 said follower member means having heights which are no  
6 greater than the boundaries of said inner fixation  
7 surfaces.

1 16. A total knee prosthesis according to Claim 14,  
2 wherein said convex cam member surface has a center of  
3 curvature substantially the same as the center of  
4 curvature of said respective follower member means and of  
5 said respective tibial plateau bearing surface means.

1 17. A total knee prosthesis according to Claim 14,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the  
4 same as the radius of curvature of said respective convex

5 cam member surfaces, said respective follower members,  
6 and said respective tibial plateau bearing surface means.

1 18. A total knee prosthesis according to Claim 14,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said convex cam member surfaces, said  
6 respective follower member means, and said respective  
7 tibial plateau bearing surface means.

1 19. A total knee prosthesis according to Claim 14,  
2 wherein said medial and lateral cam member means is  
3 integral with the outboard portion of the medial and  
4 lateral distal femoral condyles and said cam member means  
5 includes respective anterior concave surfaces connected  
6 with the respective posterior convex cam member means,  
7 and the medial and lateral posterior convex cam member  
8 means are connected to the outboard portion of the  
9 respective medial and lateral posterior femoral condyles.

1 20. A total knee prosthesis according to Claim 19,  
2 wherein said medial and lateral outboard cam member means  
3 are spaced apart by essentially one full distal or  
4 posterior femoral condyle width plus the intercondylar  
5 gap therebetween.

1 21. A total knee prosthesis according to Claim 14,  
2 wherein said medial and lateral cam member means extends  
3 anteriorly substantially to the posterior border of the  
4 anterior-distal femoral condyles, and posteriorly  
5 substantially to the anterior border of the distal-  
6 posterior femoral condyles.

1 22. A total knee prosthesis according to Claim 14,  
2 wherein said tibial plateau bearing surface means  
3 includes:

- 4       a. a medial multi-radius tibial plateau bearing  
5 surface means located inboard of said follower means and  
6 having an anterior, central and posterior portion for  
7 receiving said medial femoral condyle for rolling and  
8 sliding movement thereon;
- 9       b. a lateral inboard multi-radius tibial plateau  
10 bearing surface means located inboard of said follower  
11 means and having an anterior, central and posterior  
12 portion for receiving said inboard portion of the lateral  
13 femoral condyle for rolling and sliding movement thereon;
- 14       c. a medial outboard-located follower member  
15 consisting of a convex follower member surface anteriorly  
16 and a concave arcuate follower member surface posteriorly  
17 for receiving said anterior concave cam member surface  
18 and posterior convex cam member surface of the medial cam  
19 member means for rolling and sliding movement thereon,  
20 said medial concave arcuate follower member surface being  
21 connected to the respective posterior portion of the  
22 concave arcuate tibial plateau bearing surface means;
- 23       d. a lateral outboard-located follower member  
24 consisting of a convex follower member surface anteriorly  
25 and a concave arcuate follower member surface posteriorly  
26 for receiving said anterior concave cam member surface  
27 and posterior convex cam member surface of the medial cam  
28 member means for rolling and sliding movement thereon,  
29 said lateral concave arcuate follower member surface  
30 being connected to the respective posterior portion of  
31 the concave arcuate tibial plateau bearing surface means;  
32 and
- 33       e. an interconnecting intercondylar eminence  
34 centrally disposed between the medial and lateral multi-  
35 radius tibial plateau bearing surface means, said  
36 interconnecting eminence being connected to said plateau  
37 bearing surface means, and said being removed within the  
38 posterior intercondylar portion to provide required  
39 clearance for retained anterior and posterior cruciate  
40 ligament structures.



1 23. A total knee prosthesis according to Claim 22,  
2 wherein said convex cam member integrated within the  
3 outboard portion of the medial and lateral distal femoral  
4 condyles has a center of curvature being substantially  
5 the same as the center of curvature of said respective  
6 outboard concave arcuate follower members, of said  
7 respective outboard posterior portion of the concave  
8 arcuate tibial plateau bearing surface member means and  
9 of said respective inboard posterior portion of the  
10 concave arcuate femoro-tibial plateau bearing surface  
11 members means.

1 24. A total knee prosthesis according to Claim 22,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the  
4 same as the radius of curvature of said respective  
5 outboard convex cam members, of said respective outboard  
6 concave arcuate follower members, of said respective  
7 outboard posterior portion of the concave arcuate tibial  
8 plateau bearing surface means, and of said respective  
9 inboard posterior portions of the concave arcuate femoro-  
10 tibial plateau bearing surface member means.

1 25. A total knee prosthesis according to Claim 22,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said medial and lateral outboard convex  
6 cam member means, of said respective outboard concave  
7 arcuate follower member means, of said respective  
8 outboard posterior portion of the concave arcuate tibial  
9 plateau bearing surface means and of said respective  
10 inboard posterior portions of the concave arcuate femoro-  
11 tibial plateau bearing surface member means.

1 26. A total knee prosthesis according to Claim 14,  
2 wherein said tibial component includes a tibial plateau

3 bearing component containing medial and lateral multi-  
4 radius femoro-tibial plateau bearing surface means, an  
5 interconnecting centrally disposed eminence and outboard-  
6 located medial and lateral follower member means, and a  
7 tibial base component connected to an underside of said  
8 tibial plateau bearing component by means of a continuous  
9 and wedging peripheral and central engaging dovetail  
10 structures and preloaded and secured with a screw thread  
11 locking means which is installed anteriorly.

1 27. A total knee prosthesis capable of providing  
2 resurfacing to the adjacent ends of the existing bone  
3 structures, as well as total posterior stabilization to  
4 the knee joint, comprising:  
5 a) a femoral component including:  
6 i) a medial condyle having an anterior portion,  
7 a distal portion and a posterior portion;  
8 ii) a lateral condyle having an anterior  
9 portion, a distal portion and a posterior portion;  
10 iii) an anterior patella flange interconnecting  
11 the anterior portions of the medial and lateral condyles  
12 in parallel, spaced apart relation; and  
13 iv) a cam member means integral with said medial  
14 and lateral condyles and located outboard thereof, said  
15 cam member means having an anteriorly located concave cam  
16 member surface and a posteriorly located convex cam  
17 member surface;  
18 b) a tibial component including:  
19 i) multi-radius tibial plateau bearing surface  
20 means for receiving said medial and lateral condyles for  
21 rolling and sliding movement thereon; and  
22 ii) follower member means integral with said  
23 bearing surfaces for receiving the cam surfaces of said  
24 cam member means for rotational and sliding movement  
25 thereon; and  
26 c) said convex cam surface being in congruent  
27 contact with said follower member means from

28 approximately the end of posterior rollback to full  
29 flexion.

1 28. A total knee prosthesis according to Claim 27,  
2 wherein said medial and lateral condyles have inner  
3 fixation surfaces for fixing said femoral component to  
4 the distal end of a femur, and said cam member means and  
5 said follower member means having heights which are no  
6 greater than the boundaries of said inner fixation  
7 surfaces.

1 29. A total knee prosthesis according to Claim 27,  
2 wherein said convex cam member surface has a center of  
3 curvature substantially the same as the center of  
4 curvature of said respective follower member means and of  
5 said respective tibial plateau bearing surface means.

1 30. A total knee prosthesis according to Claim 27,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the  
4 same as the radius of curvature of said respective convex  
5 cam member surfaces, said respective follower members,  
6 and said respective tibial plateau bearing surface means.

1 31. A total knee prosthesis according to Claim 27,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said convex cam member surfaces, said  
6 respective follower member means, and said respective  
7 tibial plateau bearing surface means.

1 32. A total knee prosthesis according to Claim 27,  
2 wherein said medial and lateral cam member means is  
3 integral with the outboard portion of the medial and  
4 lateral distal femoral condyles and said cam member means  
5 includes respective anterior concave surfaces connected

6 with the respective posterior convex cam member means,  
7 and the medial and lateral posterior convex cam member  
8 means are connected to the outboard portion of the  
9 respective medial and lateral posterior femoral condyles.

1 33. A total knee prosthesis according to Claim 32,  
2 wherein said medial and lateral outboard cam member means  
3 are spaced apart by substantially one full distal or  
4 posterior femoral condyle width plus the intercondylar  
5 gap therebetween.

1 34. A total knee prosthesis according to Claim 27,  
2 wherein said medial and lateral cam member means extends  
3 anteriorly substantially to the posterior border of the  
4 anterior-distal femoral condyles, and posteriorly  
5 substantially to the anterior border of the distal-  
6 posterior femoral condyles.

1 35. A total knee prosthesis according to Claim 27,  
2 wherein said tibial plateau bearing surface means  
3 includes:

4 a. a medial multi-radius tibial plateau bearing  
5 surface means located inboard of said follower means and  
6 having an anterior, central and posterior portion for  
7 receiving said medial femoral condyle for rolling and  
8 sliding movement thereon;

9 b. a lateral inboard multi-radius tibial plateau  
10 bearing surface means located inboard of said follower  
11 means and having an anterior, central and posterior  
12 portion for receiving said inboard portion of the lateral  
13 femoral condyle for rolling and sliding movement thereon;

14 c. a medial outboard-located follower member  
15 consisting of a convex follower member surface anteriorly  
16 and a concave arcuate follower member surface posteriorly  
17 for receiving said anterior concave cam member surface  
18 and posterior convex cam member surface of the medial cam  
19 member means for rolling and sliding movement thereon,

20 said medial concave arcuate follower member surface being  
21 connected to the respective posterior portion of the  
22 concave arcuate tibial plateau bearing surface means;

23 d. a lateral outboard-located follower member  
24 consisting of a convex follower member surface anteriorly  
25 and a concave arcuate follower member surface posteriorly  
26 for receiving said anterior concave cam member surface  
27 and posterior convex cam member surface of the medial cam  
28 member means for rolling and sliding movement thereon,  
29 said lateral concave arcuate follower member surface  
30 being connected to the respective posterior portion of  
31 the concave arcuate tibial plateau bearing surface means;  
32 and

33 e. an interconnecting intercondylar eminence  
34 centrally disposed between the medial and lateral multi-  
35 radius tibial plateau bearing surface means, said  
36 interconnecting eminence being connected to said plateau  
37 bearing surface means, and said being removed within the  
38 posterior intercondylar portion to provide required  
39 clearance for retained anterior and posterior cruciate  
40 ligament structures.

1 36. A total knee prosthesis according to Claim 35,  
2 wherein said convex cam member integrated within the  
3 outboard portion of the medial and lateral distal femoral  
4 condyles has a center of curvature being substantially  
5 the same as the center of curvature of said respective  
6 outboard concave arcuate follower members, of said  
7 respective outboard posterior portion of the concave  
8 arcuate tibial plateau bearing surface member means and  
9 of said respective inboard posterior portion of the  
10 concave arcuate femoro-tibial plateau bearing surface  
11 members means.

1 37. A total knee prosthesis according to Claim 35,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a radius of curvature substantially the

4 same as the radius of curvature of said respective  
5 outboard convex cam members, of said respective outboard  
6 concave arcuate follower members, of said respective  
7 outboard posterior portion of the concave arcuate tibial  
8 plateau bearing surface means, and of said respective  
9 inboard posterior portions of the concave arcuate femoro-  
10 tibial plateau bearing surface member means.

1 38. A total knee prosthesis according to Claim 35,  
2 wherein said medial and lateral posterior femoral  
3 condyles have a center of curvature that is displaced  
4 anteriorly by some small distance relative to the center  
5 of curvature of said medial and lateral outboard convex  
6 cam member means, of said respective outboard concave  
7 arcuate follower member means, of said respective  
8 outboard posterior portion of the concave arcuate tibial  
9 plateau bearing surface means and of said respective  
10 inboard posterior portions of the concave arcuate femoro-  
11 tibial plateau bearing surface member means.

1 39. A total knee prosthesis according to Claim 27,  
2 wherein said tibial component includes a tibial plateau  
3 bearing component containing medial and lateral multi-  
4 radius femoro-tibial plateau bearing surface means, an  
5 interconnecting centrally disposed eminence and outboard-  
6 located medial and lateral follower member means, and a  
7 tibial base component connected to an underside of said  
8 tibial plateau bearing component by means of a continuous  
9 and wedging peripheral and central engaging dovetail  
10 structures and preloaded and secured with a screw thread  
11 locking means which is installed anteriorly.

1 40. A total knee prosthesis capable of providing  
2 resurfacing to the adjacent ends of the existing bone  
3 structures, as well as total posterior stabilization to  
4 the knee joint, comprising:

5 a. a femoral component including:

- 6           i. a medial condyle having an anterior  
7 condyle portion, an inboard (lateral) distal condyle  
8 portion with outboard (medial) cam member means and a  
9 posterior condyle portion;
- 10          ii. a lateral condyle having an anterior  
11 portion, an inboard (medial) distal condyle portion with  
12 outboard (lateral) cam member means and a posterior  
13 condyle portion;
- 14          iii. an anterior patella flange  
15 interconnecting the anterior portions of the medial and  
16 lateral condyles in parallel, spaced apart relation; and  
17          iv. a cam member means integrated within the  
18 outboard portion of the medial and lateral condyles, said  
19 cam members having a concave surface portion anteriorly  
20 and a convex cam member surface posteriorly;
- 21          b. a tibial component including:
  - 22           i. a medial inboard multi-radius tibial  
23 plateau bearing surface means having an anterior, central  
24 and posterior portion for receiving said inboard portion  
25 of the multi-radius medial femoral condyle for rolling  
26 and sliding movement thereon; and
  - 27           ii. a lateral inboard multi-radius tibial  
28 plateau bearing surface means having an anterior, central  
29 and posterior portion for receiving said inboard portion  
30 of the multi-radius lateral femoral condyle for rolling  
31 and sliding movement thereon; and
  - 32           iii. a medial outboard follower member  
33 comprising a convex surface anteriorly and a concave  
34 arcuate follower member surface posteriorly for receiving  
35 said anterior concave cam surface and posterior convex  
36 cam member surface of medial cam member means for  
37 rotational and sliding movement thereon, said medial  
38 outboard concave arcuate follower member surface means  
39 being connected with the respective outboard posterior  
40 portion of said inboard and outboard concave arcuate  
41 tibial plateau bearing surface means; and
  - 42           iv. a lateral outboard follower member

43 consisting of a convex surface anteriorly and a concave  
 44 arcuate follower member surface posteriorly for receiving  
 45 said anterior concave cam surface and posterior convex  
 46 cam member surface of lateral cam member means for  
 47 rotational and sliding movement thereon, said lateral  
 48 outboard concave arcuate follower member surface means  
 49 being connected with the respective outboard posterior  
 50 portion of the concave arcuate tibial plateau bearing  
 51 surface means; and

52 v. an interconnecting intercondylar eminence  
 53 centrally disposed between the medial and lateral inboard  
 54 multi-radius tibial plateau bearing surface means with  
 55 said interconnecting eminence being connected to said  
 56 inboard plateau bearing surface means and said eminence  
 57 being removed within the posterior intercondylar portion  
 58 to provide required clearance for retained anterior and  
 59 posterior cruciate ligament structures;

60 c. said medial and lateral cam member means being  
 61 in contact with said respective follower member means  
 62 from the outset of flexion and said medial and lateral  
 63 cam member means being in contact with said respective  
 64 follower member means substantially throughout the entire  
 65 flexion range of the knee joint, providing uninterrupted  
 66 posterior (tibia-femur) stabilization.

Sub B1  
 1 41. A total knee prosthesis capable of providing  
 2 resurfacing to the adjacent ends of the existing bone  
 3 structures, as well as total posterior stabilization to  
 4 the knee joint, comprising:

5 a) a femoral component including:  
 6 i) a medial condyle having an anterior portion,  
 7 a distal portion and a posterior portion;  
 8 ii) a lateral condyle having an anterior  
 9 portion, a distal portion and a posterior portion;  
 10 iii) an anterior patella flange interconnecting  
 11 the anterior portions of the medial and lateral condyles  
 12 in parallel, spaced apart relation; and



13        iv) cam member means integral with said medial  
 14        and lateral condyles and located outboard thereof, said  
 15        cam member means having an anteriorly located concave cam  
 16        member surface and a posteriorly located convex cam  
 17        member surface;

18        b) a tibial component including:

19            i) multi-radius tibial plateau bearing surface  
 20        means for receiving said medial and lateral condyles for  
 21        rolling and sliding movement thereon; and

22            ii) follower member means integral with said  
 23        bearing surfaces for receiving the cam surfaces of said  
 24        cam member means for rotational and sliding movement  
 25        thereon; and

26        c) hinge means associated with and hingably  
 27        connecting said femoral component and said tibial  
 28        component;

29        d) the cam member surfaces of said cam member means  
 30        being in contact with said follower member means for  
 31        substantially the entire flexion range of the knee.

1        <sup>2</sup>  
~~42~~. A total knee prosthesis according to Claim <sup>1</sup>~~41~~,  
 2        wherein said hinge means comprises plural spaced apart  
 3        femoral hinge components, a tibial hinge component  
 4        located between said femoral hinge components, and a  
 5        hinge axis comprising a hinge pin extending therebetween.

1        <sup>3</sup>  
~~43~~. A total knee prosthesis according to Claim <sup>2</sup>~~42~~,  
 2        wherein said hinge components define a hinge axis  
 3        passageway for the reception of said hinge pin.

1        <sup>4</sup>  
~~44~~. A total knee prosthesis according to Claim <sup>3</sup>~~43~~,  
 2        wherein the portion of said hinge <sup>axis</sup> passageway defined by  
 3        said tibial hinge component comprises a slot.

1        <sup>7</sup>  
~~45~~. A total knee prosthesis according to any of Claims  
 2        ~~42-44~~ <sup>2-4</sup>, wherein said hinge means defines a hinge-related  
 3        posterior stabilization means.

8  
 1 ~~46.~~ A total knee prosthesis according to Claim ~~45~~<sup>7</sup>,  
 2 wherein said hinge-related posterior stabilization means  
 3 comprises cam means defined by said tibial hinge  
 4 component and follower means defined by said femoral  
 5 hinge ~~component~~<sup>components</sup>.

9  
 1 ~~47.~~ A total knee prosthesis according to Claim ~~46~~<sup>8</sup>,  
 2 wherein said cam means comprises said tibial hinge  
 3 component, and said follower means comprises an  
 4 intercondylar housing defined between said femoral hinge  
 5 components and adapted to receive said tibial hinge  
 6 component for articulating engagement therein.

Sub B2  
 1 48. A total knee prosthesis according to Claim 47,  
 2 wherein said tibial hinge component comprises a tibial  
 3 post having opposed lateral peripheral surfaces and an  
 4 upper peripheral surface; said intercondylar space  
 5 comprises an intercondylar housing having lateral wall  
 6 surfaces and a roof surface; and wherein respective  
 7 lateral wall surfaces and lateral peripheral surfaces  
 8 engage each other in sliding contact, and said roof  
 9 surface and said upper peripheral surface engage each  
 10 other in rolling and sliding contact.

Sub C2  
 1 49. A total knee prosthesis according to Claim 45,  
 2 wherein said posterior stabilization means includes said  
 3 slot and said hinge pin.

6  
 1 ~~50.~~ A total knee prosthesis according to Claim ~~42~~<sup>2</sup>,  
 2 including locking means associated with said femoral  
 3 hinge components for releasably retaining said hinge pin  
 4 therein.

Sub B3  
 1 51. A hinge assembly for use in a knee prosthesis  
 2 adapted to provide hingeable connection between a femoral  
 3 component and a tibial component of such knee prosthesis,  
 4 and to offer posterior stabilization thereto, said hinge

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5 assembly comprising:  
 6 a) plural spaced apart femoral hinge components;  
 7 b) a tibial hinge component located between said  
 8 femoral hinge components;  
 9 c) a hinge axis comprising a hinge pin extending  
 10 between said femoral hinge components and said tibial  
 11 hinge components; and  
 12 d) hinge-related posterior stabilization means  
 13 comprising cam means defined by said tibial hinge  
 14 component and follower means defined by said femoral  
 15 hinge components.

1 52. A hinge assembly according to Claim 51, wherein said  
 2 cam means comprises said tibial hinge component, and said  
 3 follower means comprises an intercondylar housing defined  
 4 between said femoral hinge components and adapted to  
 5 receive said tibial hinge component for articulating  
 6 engagement therein.

*Sub B4*  
 1 53. A hinge assembly according to Claim 52, wherein said  
 2 tibial hinge component comprises a tibial post having  
 3 opposed lateral peripheral surfaces and an upper  
 4 peripheral surface; said intercondylar space comprises an  
 5 intercondylar housing having lateral wall surfaces and a  
 6 roof surface; and wherein respective lateral wall  
 7 surfaces and lateral peripheral surfaces engage each  
 8 other in sliding contact, and said roof surface and said  
 9 upper peripheral surface engage each other in rolling and  
 10 sliding contact.

1 <sup>12</sup>54. A hinge assembly according to Claim <sup>11</sup>51, wherein said  
 2 hinge components define a hinge axis passageway for the  
 3 reception of said hinge pin.

*2*  
 1 <sup>13</sup>55. A hinge assembly according to Claim <sup>12</sup>54, wherein the  
 2 portion of said hinge <sup>axis</sup> passageway defined by said tibial  
 3 hinge component comprises a slot.

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~~55~~  
1 ~~55~~. A hinge assembly according to Claim <sup>13</sup>~~55~~, wherein said  
2 posterior stabilization means includes said slot and said  
3 hinge pin.

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1 ~~56~~. A hinge assembly according to Claim <sup>11</sup>~~56~~, including  
2 locking means associated with said femoral hinge  
3 components for releasably retaining said hinge pin  
4 therein.

add B5

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